

Application No.: 09/648,455

Docket No.: 500.38949X00

Remarks

Reconsideration and allowance of this application, as amended, is respectfully requested.

This amendment is in response to the Office Action dated October 3, 2003. Appreciation is expressed for the indication of allowable subject matter in claims 3, 4, 10, 12, 15, 17-27 and 29-32. Also, appreciation is expressed for the suggestion regarding claim 1, which has been adopted herein.

Regarding the Office Action, it appears that no action was taken with regard to claim 16. Accordingly, it is not clear from the Office Action whether claim 16 has been allowed or rejected. Clarification of this matter in the next Office Action is respectfully requested.

In addition to the amending of claim 1, to respond to the suggestion in the Office Action, claim 1 has been further amended to clarify the features of the invention. Claim 2 has also been amended to clarify the structural distinctions of the spacing of the conductors. Further, new dependent claim 33 has been added to further define the arrangement of the aluminum conductors on the substrate.

Reconsideration and removal of the rejection of claim 1 over the newly cited reference to Ono (JP 40-2206139) is respectfully requested. By the present amendment, claim 1 has been amended to define that the nickel added to the aluminum conductor with copper operates "to suppress diffusion of said copper between said aluminum conductors." Although Ono teaches super-elastic bumps composed of copper, aluminum and nickel, there is absolutely no suggestion that the nickel is added to suppress the diffusion of copper between adjacent aluminum conductors. Such suppression of diffusion requires considerations of spacing and

Application No.: 09/648,455

Docket No.: 500.38949X00

the amounts of nickel, and Ono is silent with regard to this. Indeed, because the single crystalline shaped nickel base alloy bumps 6 in Ono are not closely adjacent to one another, diffusion of any copper between adjacent bumps would appear to be negligible. Therefore, it is quite clear that Ono is not even remotely concerned with the problem resolved by the present invention, which problem is clearly expressed by the amended claim 1. Quite to the contrary, the composition of the bumps 6 in Ono is for purposes of providing the desired super-elastic properties. Therefore, it is respectfully submitted that no motivation exists whatsoever in Ono for the features defined by the amended claim 1.

With regard to the issue of motivation for modification of a reference, attention is directed to the recent CAFC Decision of In Re Lee, 61 USPQ 1430. As noted there:

"This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "use that which the inventor taught against its teacher." 61 USPQ 2d 1434.

In the case of Ono, the necessary modification would require addition of the nickel in an amount sufficient to prevent diffusion between the solder bumps. This would require an analysis of the spacing of the solder bumps and the nickel content for preventing copper diffusion, which is completely absent from the Ono reference. Instead, Ono is concerned with providing super-elasticity, and adjusting the material amounts accordingly. This is a completely different consideration than that dealt with by the present invention. Therefore, reconsideration and allowance of amended claim 1 over Ono is earnestly solicited.

Application No.: 09/648,455

Docket No.: 500.38949X00

Reconsideration and allowance of independent claim 13 over Ono is also respectfully requested. Claim 13 defines the features of preventing diffusion between the adjacent aluminum/copper conductors in a means plus function format. In particular, claim 13 defines:

"means for suppressing diffusion of copper atoms in said aluminum conductors to prevent precipitation of the copper from one of the aluminum conductors to an adjacent one of the aluminum conductors."

It is respectfully submitted that Ono fails to teach or suggest any such means having this function of preventing diffusion of the copper atoms. Indeed, as noted above, it appears that the spacing of the bumps 6 in Ono would be so great that the diffusion of copper would not even be a problem. As such, there is no suggestion whatsoever in Ono of providing any means to prevent diffusion of copper since this is not an issue for Ono. This is even more the case with regard to dependent claim 14 which specifies that the means for suppressing diffusion of the copper atoms comprises nickel added to the aluminum conductors. Although Ono adds nickel, it is for the completely function of providing super-elasticity. Therefore, reconsideration and allowance of independent claim 13 and its dependent claim 14 over Ono is also respectfully requested.

Reconsideration and allowance of claims 2 and 28 over Ono is also respectfully requested. These claims define the specific spacing for operation of the present invention to permit close spacing of the aluminum conductors while providing a sufficient amount of nickel to prevent diffusion of the copper which is provided in the aluminum conductors. Normally, such close spacing would create the undesired susceptibility to the diffusion of copper between the aluminum conductors. To

Application No.: 09/648,455

Docket No.: 500.38949X00

suggest that Ono could be modified to meet these claim limitations set forth in claims 2 - 28 falls squarely within the "obvious to try" rationale specifically prohibited by the CCPA in the case of In Re Antonie (195 USPQ 6) and the CAFC in the case of In Re Fine, 5 USPQ 2d 1596. For example, as set forth in the case of In Re Antonie:

"the PTO in the minority appear to argue that it would always be obvious for one of ordinary skill in the art to try varying every parameter of a system in order to optimize the effectiveness of the system even if there is no evidence *in the record that the prior art recognized that particular parameter affected the result. As we have said many times, obvious to try is not the standard of 35 USC §103.*" 195 USPQ 8.

It is respectfully submitted that this clearly applies in the present instance where it is recognized in the Office Action that the reference fails to teach the claimed spacing and relies on "routine experimentation" to try to overcome this recognized shortcoming in the prior art. Therefore, reconsideration and allowance of claims 2 and 28 over Ono is also respectfully requested.

Consideration and allowance of newly submitted dependent claim 33 is also respectfully requested. This claim, dependent on claim 1, defines:

"wherein each of the aluminum conductors extends parallel to the main face of the substrate to electrically connect portions on the substrate to each other, *which portions are separated from each other along the main face of the substrate.*"

As such, a structure is set forth which is significantly different from the bumps 6 of Ono which are clearly not arranged to "extend parallel to the main face of the substrate." Accordingly, consideration and allowance of this new dependent claim 33 over Ono is also respectfully requested.

Application No.: 09/648,455

Docket No.: 500.38949X00

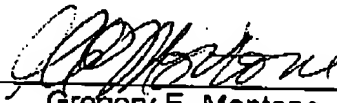
If the Examiner believes that there are any other points which may be clarified or otherwise disposed of, either by telephone discussion or by a personal interview, the Examiner is invited to contact the undersigned representative at the number indicated below.

To the extent necessary, applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage in the fees due in connection with the filing of this paper, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Acct. No. 01-2135 (Docket No. 500.38949X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By



Gregory E. Montone
Reg. No. 28,141

GEM/dks/dlt

1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666